QUALITATIVE DATA ANALYSIS SYSTEM AND METHOD

FIELD OF INVENTION

The present invention relates to the field of qualitative data analysis. In one aspect, the present invention relates to a system, method and schema

5   relating to the analysis of data collected in commercial research projects, such as group discussions and in-depth interviews, etc.

BACKGROUND ART

The inventor has found that in conducting research, the result gathered needs to be analysed so that insight, interpretations and conclusions can be

10   distilled from the research conducted. A number of software products exist which assist researchers in handling and interpreting relatively complex data, but they are considered only generally suitable for thorough and time-consuming work in an academic context.

The inventor has also found that researchers involved in commercial

15   research projects, on the other hand, generally have tighter research guidelines, less structured data and less time for analysis. Researchers conducting these commercial projects generally rely on manual methods of analysis or using standard office packages, like 'Microsoft Word'.

The inventor has further found that a research project generally has three

20   phases, the first being Conducting Groups and/or Interviews, the second being Collecting and Sorting data, and the third being Analysing, Interpreting data and Reporting findings to a Client. Time pressures are a common problem in this type of research, and due to the commercial nature of the research, work plans tend to be changeable, which means that researchers may work on several projects at

25   the one time. Sometimes, a researcher is forced to change the approach taken to the research analysis due to the time available for the project. For example, the researcher may prefer to work by reviewing audio or video together with detailed text of a focus group or in-depth interview, but may not be able to do so within the constraints of the project time frame available.

30   Furthermore, projects vary both in size and design. They may comprise any number of respondents, such as focus groups (including mini-groups) and/or in-depth interviews and/or small surveys. Researchers use a number of

techniques to assist them in discovering the information the client requires, such as:

- Projective Techniques - techniques used to stimulate discussion among participants. Participants are encouraged to attribute their feelings, beliefs or motivations to another person, object or situation. Examples of projective techniques are word association, sentence completion, expressive drawing and thematic apperception tests (bubble drawings).

- Association Technique - is a form of projective technique where participants are presented with some stimulus material and they are then asked to respond with the first thing that comes to their minds, and

- Completion Technique - is a form of projective technique where participants are asked to complete an incomplete situation.

Any discussion of documents, devices, acts or knowledge in this specification is included to explain the context of the invention. It should not be taken as an admission that any of the material forms a part of the prior art base or the common general knowledge in the relevant art in Australia or elsewhere on or before the priority date of the disclosure and claims herein.

It is an object of the present invention to provide an improved market research tool for use by researchers in conducting qualitative data analysis.

It is also an object of the present invention to alleviate at least one disadvantage associated with the prior art.

SUMMARY OF INVENTION

The present invention provides, in one aspect, a method of and/or device for inputting data into a qualitative research tool, the method comprising the step of inputting the data in association with a heading, such as a concept heading.

The present invention provides, in another aspect, a method of and/or device for inputting data into a qualitative research tool, the method comprising the step of inputting the data in association with a sample, such as a respondent.

The present invention provides, in still another aspect, a method of and/or device for inputting data into a qualitative research tool, the method comprising the step of inputting or analysing the data in commentary format, such as an AVI format.

In a preferred embodiment, commentary, such as AVI represents:

Articulation which is substantially what the research participant said, preferably expressed in the words of the researcher,

Verbatim which is substantially a reproduction of substantially all, or a
5 representative part, of a respondent's comment, such as a direct quotation from a research participant, and

Interpretation which is substantially the researcher's · observations, interpretations and conclusions on what the research participants said.

AVI is applicable as a manner of input. AVI is more generally a manner of
10 classifying input and/or data. AVI may be attached to concept and/or respondent.

Preferably, the present invention enables the marking-up on an originally imported document.

The present invention provides, in still another aspect, a method of and/or device for inputting data into a qualitative research tool, the method comprising
15 the step of defining relationships between data, based on unique indicia.

The present invention provides, in yet another aspect, a method of and/or device for arranging data in a qualitative research tool, the method comprising providing analysis frameworks, such as a brand sort analysis framework for inputting, analysing and/or interpreting research findings wherein the framework
20 has a structure that supports the research method in use.

The present invention provides, in still another aspect, a schema as herein disclosed.

Other aspects and preferred aspects are disclosed in the specification and/or defined in the appended claims, forming a part of the description of the
25 invention.

In essence, it has been found that commentary, such as AVI substantially mimics the way that commercial researchers interpret the data. Also having features such as marking-up on original material, concept headings and brand/picture sort functions enable qualitative research analysis to be enhanced.

30 The present invention provides a number of advantages, such as:

• Allowing a quick way to import research data,

• Providing for flexible identification of themes for a project,

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- Allowing research data to be allocated to a theme(s),

- Allowing interpretations to be recorded in an organised format and to provide an insight into proceedings,

- Allowing analysis to be ongoing as data is received,

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- Allowing data from multiple researchers to be collected into one project,

- Providing for review of research data that has been already allocated as analysis data,

- Allowing verbatims to be recorded in an organised format while performing analysis,

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- Provide for a flexible analysis framework that can be altered in line with findings,

- Providing a structured approach to working with commonly used QMR techniques,

- Additionally, Analysis Frameworks enable users to use different QMR
15   techniques within the same project:

- input the data in the manner which best supports the technique (e.g. use Concept Analysis Framework to evolve concepts from predecessors)

- analyse the project's data as a whole (i.e. query across Analysis
20   Frameworks; difficult to do manually)

- and/or combine results from different Analysis Frameworks to produce project outputs (reports/presentations).

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood

25   that the detailed description and specific examples, while indicating preferred · embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

DESCRIPTION OF DRAWINGS

30   Further disclosure, objects, advantages and aspects of the present application may be better understood by those skilled in the relevant art by reference to the following description of preferred embodiments taken in

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conjunction with the accompanying drawings, which are given by way of illustration only, and thus are not limitative of the present invention, and in which:

Figure 1 illustrates an overview of the product features of the market research tool according to the present invention,

Figure 2 illustrates a logical representation of the market research tool according to an embodiment of the present invention,

Figure 3 illustrates data entered and/or formatted according to AVI,

Figure 4 illustrates schematically an example use of the present invention, and

Figure 5 illustrates a data model according to the present invention.

DETAILED DESCRIPTION

OVERVIEW

Figure 1 illustrates schematically an overview of the market research tool according to the present invention. A schema providing a substantial enabling disclosure of the present invention is provided below. Various functions (often implemented as screens) of the embodiment are schematically represented. The present invention should not be limited to only these screens, as screens may be deleted, added or re-configured according to the particular use of the present invention.

The research tool 101 has a project or template function 102. This function facilitates configuration of:

- new project or template definitions which are freshly used for each project. In essence a new file is created,

- project or template properties, which facilitates the set up of background information to the project in a manner that enables it to be used as a reference, such as project name, client contact, researcher, etc.

The import function 103 facilitates the import and merging of projects or templates. In one embodiment, this function is performed by:

1.   User finds and selects a project or template to import

2.   System displays import options

3.   User accepts default options or selects other options

4.   System checks for data match and imports requested data

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One aspect of the present invention relates to a user being able to optionally mark-up sections of data in an imported document. The process is marked on the original material. This marking function allows certain or selected data to be allocated to a selected heading and/or sample as a commentary such

5   as AVI. The mark-up is performed by highlighting the desired text, then it is visually changed, and then a copy/paste function is performed. The function enables a user to know what areas have been covered and it assists in the promotion of data to the correct area. Researcher's interpretation can be input at the same time as data is collected. The document records the mark-ups in a

10   manner that enables the mark-up to be identifiable. In one embodiment, this function is performed by:

1.   User selects data

2.   User selects to apply a mark-up

3.   System marks up the selected data.

15   The project explorer function 104 facilitates navigation of various project components and application functions.

The document function 105 facilitates importing, searching, printing or marking up of various documents. In one embodiment, this function is performed by:

20   1.   User finds and selects a data file to import

2.   System displays document types (with default)

3.   User accepts the default document type or selects another.

4.   System imports the data file, ensuring the name is unique

5.   System opens the newly imported document

25   The report function 106 facilitates the creation of reports or presentations which can be created from the project data and saved in a prescribed manner. It enables the outputs to be edited as desired.

The Respondents function 107 facilitates configuration of:

•   Respondents which define the sample which has sample characteristics,

30   and the characteristics have values for the data sets.

•   New/Edit Respondents allows creation or modification of respondents.

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The Sample Characteristics function 108 facilitates configuration of:

- Sample characteristics which define the attributes of the sample, such as those based on demographic or other information. They facilitate the creation of sub-samples, which enables the comparison of sets of data,

5 • New/Edit Sample Characteristics which allows editing or creation of new sample characteristics,

- Assign Characteristic values which enable certain values to be assigned to a data set for each sample.

The Sub-samples function 109 facilitates the configuration of various

10 samples into sub-groupings based on a shared value.

The Analysis function 110 facilitates configuration of:

- Interpretations which are the researcher's observations and conclusions on what the research participants said, and

- Analysis frameworks which provide a structure for inputting, analysing and

15 interpreting research findings. Depending on the project, there may be

o a draft analysis framework to structure data collection

o an analysis framework based on the results of field work

In general, a generic analysis framework enables the creation of a hierarchical heading structure to suit a project. The analysis framework facilitates

20 the process by which sense and meaning are made of the data, gathered in qualitative research, and by which the emergent knowledge is applied to the client's problems. Through processes of revisiting and immersion in the data, and through complex activities of structuring, re-framing or otherwise exploring it, the researcher looks for patterns and insights relevant to the key research issues and

25 uses these to address the client's brief. A framework can be applied in a general sense i.e. a generic framework or be specific to a particular type of data/research technique e.g. concept, brand, picture sort framework. A concept analysis framework enables the tracking of the evolution of a concept based on feedback by participants and facilitates the analysis of an idea/concept or set of ideas. This

30 might be used to develop a new product or service, or an extension or amendment to an existing one. A brand sort analysis framework facilitates the division   of   brands   into   discrete   segments   based   on   shared

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characteristics/requirements/needs/benefits/etc. A picture sort analysis framework facilitates the division of pictures by brands based on shared characteristics/requirements/needs/benefits/ etc.

In accordance with one embodiment of the Analysis function, if a User wants to add a hierarchical heading to a generic or concept Analysis Framework, then

1.   User selects a hierarchical heading
2.   User selects to add a heading
3.   System displays;
     • Image style
     • Heading Name
4.   User enters Heading text (mandatory).
5.   User continues
6.   System validates that heading name is unique within headings of the same parent.
7.   System adds the new heading

Furthermore, in accordance with the Analysis function, if a User wants to modify a concept heading, then:

1.   User selects a concept heading
2.   User selects to modify the concept heading
3.   System displays;
     • Heading style
     • Heading Samples
     • Heading text
     • Heading image – only if 'picture style' heading defaults
4.   User modifies one or more of the following;
     • Changes the heading text (mandatory field)
     • Changes the heading style (mandatory field)
     • Adds Sample(s) to associate to the Concept (mandatory field).
5.   User continues

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6.   System validates that heading text is unique within the concept
        headings of the Analysis Framework

7.   Concept is modified

Furthermore, in accordance with the Analysis function, if a User wants to
evolve a concept heading to a new concept from one or more predecessor(s), or
terminate a concept, then:

1.   User selects one or more existing concept headings

2.   User selects to evolve to a single concept heading

3.   User enters evolution interpretation(s)

4.   System displays for the new concept heading:

    •   Predecessor concept heading(s) (selected concept headings
            from step 1)

    •   default heading style

    •   default Samples

    •   default heading text

    •   default heading image – only if 'picture style' heading defaults

5.   *System creates new Concept heading, setting up relationships.*

In accordance with another aspect of invention, a brand/sort function is
provided. This is also associated with Analysis 110 of Figure 1. The brand/sort
function provides a unique problem statement, such as a statement of a
commercial problem or issue. It is used to define relationships.

In accordance with the Analysis function, if a User wants to replace the
heading text or the associated heading image, which facilitates a brand / picture
sort function, then:

1.   User selects 'parent' or 'child' heading

2.   User selects to modify the heading text

3.   User modifies the text of the heading

4.   User continues

5.   System validates heading text

6.   System checks for related data

7.   System displays message – all related data will also be updated

8.   User acknowledges message

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9.   System updates heading and any related data

Furthermore, in accordance with the Analysis function, if a User wants to add a commentary, such as an AVI, to a sub-sample/ heading, then:

1.   User-selects;
- Sub-Sample
- 'Heading' (any type)

2.   User selects to add either an Articulation, Verbatim or Interpretation

3.   User enters text (mandatory)

4.   User continues

5.   System adds the AVI

6.   Optional: repeat step 2 –5 to add any additional AVIs for the same SubSample/Heading

Again, in Figure 1, the Query screen 111 comprises various screens which enable the interrogation of data and/or project information. In accordance with still another aspect of invention the query function 111, as illustrated in Figure 1, provides a query by heading against commentary or AVI or query against heading. In accordance with one embodiment, the query function is performed by:

1.   User selects to create a query and nominates the query type

2.   System sets default query parameters

3.   User optionally changes default query parameters and executes the query

4.   System displays query results

Furthermore, in accordance with the Query function, if a User wants to query other notation, headings, concepts or indicia, a query function is able to be established, such as by selecting an appropriate filter to be applied to the data field, corresponding to the query to be undertaken.

AVI

In the prior art, the research data has been introduced into the research tool in one large 'dump' of information. The research data would be then be investigated and interpreted/amended in order to give the research output. This

requires a large amount of time and analysis. The present invention has been developed to be more aligned with the needs of commercial researchers.

In accordance with one aspect of the present invention, research data is input in accordance with Commentary, such as Articulation, Verbatim or
5   Interpretation (AVI). In Figure 1, this feature is associated with Analysis 110 and its associated Analysis Framework, and In Figure 2, as described below, a logical representation of this feature is illustrated.

Figure 3, however, provides some more detailed in which the AVI 301 comprises:

10   •   Articulation 302, which is substantially what the research participant said, preferably expressed in the words of the researcher,

     •   Verbatim 303, which is substantially a reproduction of substantially all, or a representative part, of a respondent's comment, such as a direct quotation fro a research participant, and

15   •   Interpretation 304, which is substantially the researcher's observations and conclusions on what the research participants said.

The advantage of entering and/or formatting input data in accordance with AVI is that the research data can be analysed and/or queried as the data is gathered. This provides time benefits in reporting and interpreting the data, and
20   enables the researcher to modify (if necessary) the research as it is conducted. Additionally, using the different AVI types (Articulation, Verbatim, Interpretation), a user can easily distinguish the source of the data (i.e. whether It came from respondents indirectly or word-for-word, or whether it represents their own interpretive thinking). It has been found that AVIs make it easier for users to find
25   what they're looking for. For example:

     •   to look through the Verbatims to find an interesting quote that supports their argument

     •   to query Interpretations only to provide an outline of findings for their client report

30   The present invention gives a relatively immediate analysis response / interpretation of the research that is conducted. Thus the research may be able to be adjusted, if necessary.

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In accordance with another aspect of the present invention, research data, such as AVI, is assigned at the level within the project to which it applies, which may be the project itself, an analysis framework representing a topic or research methodology, or a heading and/or sample within an analysis framework, where a
5   heading may represent a topic or an emergent theme and a sample may represent a respondent.

It has been found that AVI substantially mimics the way that commercial researchers interpret the data.

Figure 2, illustrates one representation of the logical relationship of various
10 data entities of the present invention. With regard to the embodiment illustrated:

- Project - a Project represents an entire piece of research that can be persisted as a Project or a Template. A Project has zero or more Analysis Frameworks, Commentaries (Project Interpretations), Documents, Persons, Queries, Sample Characteristics, Samples.

15 - Document - a Document represents a Research Data, Project Artefact, Report or Presentation.

- Person - a Person represents a Client Contact or Researcher.

- Analysis Framework - an Analysis Framework represents a structure for inputting, analysing and interpreting research findings. An Analysis
20   Framework has zero or more Headings and Commentaries.

- Concept Analysis Framework - a Concept Analysis Framework is a specialisation of Analysis Framework that tracks the evolution of a concept. A Concept Analysis Framework has zero or more Concept Headings, Hierarchical Headings, Analysis Framework Commentaries and Concept
25   Commentaries.

- Generic Analysis Framework - a Generic Analysis Framework is a specialisation of Analysis Framework that provides generic analysis using Hierarchical Headings. A Generic Analysis Framework has zero or more Hierarchical Headings and Analysis Framework Commentaries.

30 - Sort Analysis Framework - a Sort Analysis Framework is a specialisation of Analysis Framework that facilitates the division of brands (Brand Sort) into discrete segments based on shared characteristics or the division of

pictures (Picture Sort) by brand segments based on shared characteristics. A Sort Analysis Framework has zero or more Sort Headings, Segment Sorts, Segment Sort Commentaries, and Analysis Framework Commentaries.

5 • Commentary – a Commentary represents an Articulation, Verbatim, or Interpretation.

   • Analysis Framework Commentary – an Analysis Framework Commentary is a specialisation of a Commentary that is used within Analysis Frameworks. An Analysis Framework Commentary may be associated to

10 zero or one Headings and zero or one Samples.

   • Concept Commentary – a Concept Commentary is a specialisation of a Commentary that is used within Concept Analysis Frameworks. A Concept Commentary may be associated to one or two Concept Headings (predecessor and/or successor) and one or more Samples.

15 • Segment Sort Commentary – a Segment Sort Commentary is a specialisation of a Commentary that is used within Sort Analysis Frameworks. A Segment Sort Commentary must be associated to a Segment Sort and optionally to a Sort Heading.

   • Heading – a Heading represents a theme or a way of structuring the

20 analysis.

   • Concept Heading – a Concept heading is a specialisation of a Hierarchical Heading that is used within Concept Analysis Frameworks.

   • Hierarchical Heading – a Hierarchical Heading is a specialisation of a Heading that is used within Generic Analysis Frameworks and Concept

25 Analysis Frameworks. A Hierarchical Heading may be associated to zero or more child Hierarchical Headings.

   • Sort Heading – a Sort Heading is a specialisation of a Heading that is used within Sort Analysis Frameworks. A Sort Heading in a Brand Sort is known as a Brand, and in a Picture Sort is known as a Picture.

30 • Segment Sort – a Segment Sort represents a segment as a Category in a Brand Sort or a Brand in a Picture Sort. A Segment Sort is associated to one Sample and must have one or more Sort Headings.

- Query - a Query represents a means of extracting and representing analysis information from different perspectives. A Query is associated to many different items.

- Query Commentary - a Query Commentary is a specialisation of Query that is used to analyse Commentaries.

- Query Concept - a Query Concept is a specialisation of Query that is used to analyse Concepts.

- Query Segment Sort - a Query Segment Sort is a specialisation of Query that is used to analyse Segments.

- Query Text - a Query Text is a specialisation of Query that is used to analyse heading and commentary text.

- Sample - a Sample represents the project's sample and is a generalisation of Respondents and Sub Samples. A Sample is associated to zero or more Sample Characteristic Values.

- Respondent - a Respondent represents a Group, Depth, or Other. A Respondent is a specialisation of a Sample.

- Sub Sample - a Sub Sample represents one or more Respondents or one or more Sample Characteristic Values. A Sub Sample is a specialisation of a Sample and is associated to zero or more Respondents.

- Sample Characteristic - a Sample Characteristic represents an aspect common to the Samples. A Sample Characteristic has zero or more Sample Characteristic Values.

- Sample Characteristic Value - a Sample Characteristic Value represents a trait of a Sample Characteristic.

Figure 4 provides a relatively simple representation of the use of the present invention. A project is created 401, and then a query 402 is raised as to whether the project has any artefacts. Artefacts can be stored at 403. The qualitative research is then conducted 404, and data is collected. Any online research data can be stored 406, otherwise, one or more analysis frameworks can be completed 407, followed by analysis 408 (perhaps on-line) as required, and as described above. A reporting framework 409 can thereafter be

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completed, and exported 410. The report can be reported to the client 411, and if necessary, further analysis 412 can be conducted.

Schema

     Figure 5 illustrates a data model according to the present invention. The

5   data model represents relatively generally the manner in which information represented by the logical entities in Figure 2 can be saved. The data model is notated as an Entity-Relationship diagram; where each box represents an entity (table), each row in the box represents a field (column) with its data type, and each line between entities represents the relationship (link between tables).

10   An example of the data model is provided in the form of the described below, which is given as only one example according to an embodiment of the present invention:

        <?xml version="1.0" encoding="utf-8" ?>

        <xs:schema   targetNamespace="http://qsr.com.au/XSight.xsd"

15   xmlns="http://qsr.com.au/XSight.xsd"

             xmlns:mstns="http://qsr.com.au/XSight.xsd"

       xmlns:xs="http://www.w3.org/2001/XMLSchema"

             xmlns:msdata="urn:schemas-microsoft-com:xml-msdata"

     version="1.0">

20   <xs:element name="Project">

                 <xs:complexType>

                   <xs:sequence>

                      <xs:element   name="Title"   type="xs:string" nillable="false" />

25   <xs:element   name="Description" type="xs:string" nillable="false" />

                      <xs:element   name="CommissioningClient" type="xs:string" nillable="false" />

                      <xs:element   name="OnBehalfOfClient"

30   type="xs:string" nillable="false" />

                      <xs:element name="VerbatimQuotationCharacterEnabled" type="xs:boolean" nillable="false" />

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                        <xs:element
name="VerbatimSampleCharacteristicIncluded" type="xs:boolean" nillable="false"
/>
                        <xs:element
5    name="VerbatimQuotationCharacter" type="xs:string" nillable="false" />
                        <xs:element        name="VerbatimItalics"
type="xs:boolean" nillable="false" />
                        <xs:element name="Password" type="xs:string"
nillable="false" />
10                       <xs:element    name="Hint"    type="xs:string"
nillable="false" />

                        <xs:element   name="Version"   type="xs:string"
nillable="false" />
                        <xs:element    name="Type"    type="xs:string"
15   nillable="false" />
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:element name="Person">
20              <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Identifier" type="xs:integer"
nillable="false" />
                        <xs:element    name="Name"    type="xs:string"
25   nillable="false" />
                        <xs:element   name="Position"   type="xs:string"
nillable="false" />
                        <xs:element                name="Description"
type="xs:string" nillable="false" />
30                       <xs:element    name="Role"    type="xs:string"
nillable="false" />
                        <xs:element                name="PrimaryContact"
type="xs:boolean" nillable="false" />
```

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                </xs:sequence>
            </xs:complexType>
            <xs:key                              name="PersonPrimaryKey"
    msdata:PrimaryKey="true">
5               <xs:selector xpath="." />
                <xs:field xpath="Identifier" />
            </xs:key>
        </xs:element>
        <xs:element name="Document">
10          <xs:complexType>
                <xs:sequence>
                    <xs:element name="Identifier" type="xs:integer"
    nillable="false" />
                    <xs:element  name="Name"   type="xs:string"
15  nillable="false" />
                    <xs:element   name="Type"   type="xs:string"
    nillable="false" />
                </xs:sequence>
            </xs:complexType>
20          <xs:key                              name="DocumentPrimaryKey"
    msdata:PrimaryKey="true">
                <xs:selector xpath="." />
                <xs:field xpath="Identifier" />
            </xs:key>
25      </xs:element>
        <xs:element name="SampleCharacteristic">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="Identifier" type="xs:integer"
30  nillable="false" />
                    <xs:element  name="Name"   type="xs:string"
    nillable="false" />
                </xs:sequence>
```

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        </xs:complexType>
        <xs:key              name="SampleCharacteristicPrimaryKey"
msdata:PrimaryKey="true">
                <xs:selector xpath="." />
5               <xs:field xpath="Identifier" />
        </xs:key>
    </xs:element>
    <xs:element name="SampleCharacteristicValue">
        <xs:complexType>
10              <xs:sequence>
                    <xs:element name="Identifier" type="xs:integer"
nillable="false" />
                    <xs:element    name="Name"    type="xs:string"
nillable="false" />
15                  <xs:element
name="SampleCharacteristicIdentifier" type="xs:integer" nillable="false" />
                </xs:sequence>
        </xs:complexType>
        <xs:key              name="SampleCharacteristicValuePrimaryKey"
20  msdata:PrimaryKey="true">
                <xs:selector xpath="." />
                <xs:field xpath="Identifier" />
        </xs:key>
        <xs:keyref
25  name="SampleCharacteristicSampleCharacteristicValue"
    refer="SampleCharacteristicPrimaryKey">
                <xs:selector xpath="." />
                <xs:field xpath="SampleCharacteristicIdentifier" />
        </xs:keyref>
30  </xs:element>
    <xs:element name="Respondent">
        <xs:complexType>
            <xs:sequence>
```

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```
                <xs:element                name="SampleIdentifier"
type="xs:integer" nillable="false" />
                <xs:element    name="Type"    type="xs:string"
nillable="false" />
5                <xs:element name="DateTime" type="xs:string"
nillable="false" />
                <xs:element                name="Description"
type="xs:string" nillable="false" />
            </xs:sequence>
10        </xs:complexType>
        <xs:key                name="RespondentPrimaryKey"
msdata:PrimaryKey="true">
            <xs:selector xpath="." />
            <xs:field xpath="SampleIdentifier" />
15        </xs:key>
        <xs:keyref                name="SampleRespondent"
refer="SamplePrimaryKey">
            <xs:selector xpath="." />
            <xs:field xpath="SampleIdentifier" />
20        </xs:keyref>
    </xs:element>
    <xs:element name="SampleSampleCharacteristicValue">
        <xs:complexType>
            <xs:sequence>
25                <xs:element                name="SampleIdentifier"
type="xs:integer" nillable="false" />
                <xs:element
name="SampleCharacteristicValueIdentifier" type="xs:integer" nillable="false" />
            </xs:sequence>
30        </xs:complexType>
        <xs:key
name="RespondentSampleCharacteristicValuePrimaryKey"
msdata:PrimaryKey="true">
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```
                <xs:selector xpath="." />
                <xs:field xpath="SampleIdentifier" />
                <xs:field   xpath="SampleCharacteristicValueIdentifier"
 />
 5          </xs:key>
            <xs:keyref
 name="SampleCharacteristicValueRespondentSampleCharacteristicValue"
 refer="SampleCharacteristicValuePrimaryKey">
                <xs:selector xpath="." />
10               <xs:field   xpath="SampleCharacteristicValueIdentifier"
 />
            </xs:keyref>
            <xs:keyref
 name="SampleSampleSampleCharacteristicValue" refer="SamplePrimaryKey">
15               <xs:selector xpath="." />
                <xs:field xpath="SampleIdentifier" />
            </xs:keyref>
        </xs:element>
        <xs:element name="SubSampleRespondent">
20          <xs:complexType>
                <xs:sequence>
                    <xs:element            name="SampleIdentifier"
 type="xs:integer" nillable="false" />
                    <xs:element        name="RespondentIdentifier"
25 type="xs:integer" nillable="true" />
                </xs:sequence>
            </xs:complexType>
            <xs:unique        name="SubSampleCompositionPrimaryKey"
 msdata:PrimaryKey="true">
30               <xs:selector xpath="." />
                <xs:field xpath="SampleIdentifier" />
                <xs:field xpath="RespondentIdentifier" />
            </xs:unique>
```

```
                    <xs:keyref         name="SubSampleSubSampleComposition"
: refer="SamplePrimaryKey">
                        <xs:selector xpath="." />
                        <xs:field xpath="SampleIdentifier" />
5               </xs:keyref>
                    <xs:keyref         name="RespondentSubSampleRespondent"
refer="RespondentPrimaryKey">
                        <xs:selector xpath="." />
                        <xs:field xpath="RespondentIdentifier" />
10              </xs:keyref>
            </xs:element>
            <xs:element name="AnalysisFramework">
                <xs:complexType>
                    <xs:sequence>
15                      <xs:element name="Identifier" type="xs:integer"
nillable="false"></xs:element>
                        <xs:element   name="Name"   type="xs:string"
nillable="false" />
                        <xs:element   name="Type"   type="xs:string"
20 nillable="false" />
                    </xs:sequence>
                </xs:complexType>
                <xs:key              name="AnalysisFrameworkPrimaryKey"
msdata:PrimaryKey="true">
25                      <xs:selector xpath="." />
                        <xs:field xpath="Identifier" />
                </xs:key>
            </xs:element>
            <xs:element name="Heading">
30              <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Identifier" type="xs:integer"
nillable="false" />
```

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```
                        <xs:element    name="Name"    type="xs:string"
nillable="false" />
                        <xs:element
name="AnalysisFrameworkIdentifier" type="xs:integer" nillable="false" />
5                       <xs:element                      name="Image"
type="xs:hexBinary" nillable="true" />
                        <xs:element    name="Type"    type="xs:string"
nillable="false" />
                  </xs:sequence>
10            </xs:complexType>
              <xs:key                        name="HeadingPrimaryKey"
msdata:PrimaryKey="true">
                  <xs:selector xpath="." />
                  <xs:field xpath="Identifier" />
15            </xs:key>
              <xs:keyref             name="AnalysisFrameworkHeading"
refer="AnalysisFrameworkPrimaryKey">
                  <xs:selector xpath="." />
                  <xs:field xpath="AnalysisFrameworkIdentifier" />
20            </xs:keyref>
        </xs:element>
        <xs:element name="HeadingHierarchy">
              <xs:complexType>
                  <xs:sequence>
25                      <xs:element    .    name="HeadingIdentifier"
type="xs:integer" nillable="false" />
                        <xs:element    name="ChildHeadingIdentifier"
type="xs:integer" nillable="false" />
                  </xs:sequence>
30            </xs:complexType>
              <xs:key              name="HierarchicalHeadingPrimaryKey"
msdata:PrimaryKey="true">
                  <xs:selector xpath="." />
```

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```
                    <xs:field xpath="HeadingIdentifier" />
                    <xs:field xpath="ChildHeadingIdentifier" />
            </xs:key>
            <xs:keyref              name="HeadingHeadingHierarchy"
 5   refer="HeadingPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="HeadingIdentifier" />
            </xs:keyref>
            <xs:keyref              name="HeadingHeadingHierarchy1"
10   refer="HeadingPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="ChildHeadingIdentifier" />
            </xs:keyref>
        </xs:element>
15      <xs:element name="HeadingConcept">
            <xs:complexType>
                <xs:sequence>
                    <xs:element              name="HeadingIdentifier"
 type="xs:integer" nillable="false" />
20                   <xs:element              name="Terminated"
 type="xs:boolean" nillable="false" />
                </xs:sequence>
            </xs:complexType>
            <xs:key              name="ConceptHeadingPrimaryKey"
25   msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="HeadingIdentifier" />
            </xs:key>
            <xs:keyref              name="HeadingHeadingConcept"
30   refer="HeadingPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="HeadingIdentifier" />
            </xs:keyref>
```

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```
    </xs:element>
    <xs:element name="HeadingConceptSample">
        <xs:complexType>
            <xs:sequence>
                    <xs:element            name="HeadingIdentifier"
type="xs:integer" nillable="false" />
                    <xs:element            name="SampleIdentifier"
type="xs:integer" nillable="true" />
            </xs:sequence>
        </xs:complexType>
        <xs:unique  name="ConceptHeadingRespondentPrimaryKey"
msdata:PrimaryKey="true">
                <xs:selector xpath="." />
                <xs:field xpath="HeadingIdentifier" />
                <xs:field xpath="SampleIdentifier" />
        </xs:unique>
        <xs:keyref           name="HeadingHeadingConceptSample"
refer="HeadingPrimaryKey">
                <xs:selector xpath="." />
                <xs:field xpath="HeadingIdentifier" />
        </xs:keyref>
        <xs:keyref           name="SampleHeadingConceptSample"
refer="SamplePrimaryKey">
                <xs:selector xpath="." />
                <xs:field xpath="SampleIdentifier" />
        </xs:keyref>
    </xs:element>
    <xs:element name="SegmentSort">
        <xs:complexType>
            <xs:sequence>
                    <xs:element name="Identifier" type="xs:integer"
nillable="false" />
```

```
                                <xs:element
name="CategoryBrandHeadingIdentifier" type="xs:integer" nillable="false" />
                                <xs:element          name="SampleIdentifier"
type="xs:integer" nillable="true" />
5                           </xs:sequence>
                       </xs:complexType>
                       <xs:key                    name="SegmentSortPrimaryKey"
msdata:PrimaryKey="true">
                           <xs:selector xpath="." />
10                         <xs:field xpath="Identifier" />
                       </xs:key>
                       <xs:keyref                  name="HeadingSegmentSort"
refer="HeadingPrimaryKey">
                           <xs:selector xpath="." />
15                         <xs:field xpath="CategoryBrandHeadingIdentifier" />
                       </xs:keyref>
                       <xs:keyref                  name="SampleSegmentSort"
refer="SamplePrimaryKey">
                           <xs:selector xpath="." />
20                         <xs:field xpath="SampleIdentifier" />
                       </xs:keyref>
                   </xs:element>
                   <xs:element name="SegmentSortComposition">
                       <xs:complexType>
25                         <xs:sequence>
                                <xs:element          name="SegmentSortIdentifier"
type="xs:integer" nillable="false" />
                                <xs:element
name="BrandPictureHeadingIdentifier" type="xs:integer" nillable="false" />
30                         </xs:sequence>
                       </xs:complexType>
                       <xs:key          name="SegmentSortCompositionPrimaryKey"
msdata:PrimaryKey="true">
```

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```
                    <xs:selector xpath="." />
                    <xs:field xpath="SegmentSortIdentifier" />
                    <xs:field xpath="BrandPictureHeadingIdentifier" />
                </xs:key>
5               <xs:keyref    name="SegmentSortSegmentSortComposition"
    refer="SegmentSortPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="SegmentSortIdentifier" />
                </xs:keyref>
10              <xs:keyref              name="HeadingSegmentSortComposition"
    refer="HeadingPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="BrandPictureHeadingIdentifier" />
                </xs:keyref>
15          </xs:element>
            <xs:element name="Commentary">
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Identifier" type="xs:integer"
20  nillable="false"></xs:element>
                        <xs:element
    name="AnalysisFrameworkIdentifier" type="xs:integer" nillable="false" />
                        <xs:element    name="Type"    type="xs:string"
    nillable="false" />
25                      <xs:element    name="Text"    type="xs:string"
    nillable="false" />
                    </xs:sequence>
                </xs:complexType>
                <xs:key                      name="CommentaryPrimaryKey"
30  msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="Identifier" />
                </xs:key>
```

```
                    <xs:keyref            name="AnalysisFrameworkCommentary"
refer="AnalysisFrameworkPrimaryKey">
                              <xs:selector xpath="." />
                              <xs:field xpath="AnalysisFrameworkIdentifier" />
                    </xs:keyref>
               </xs:element>
          <xs:element name="CommentaryAnalysisFramework">
               <xs:complexType>
                    <xs:sequence>
                              <xs:element            name="CommentaryIdentifier"
type="xs:integer" nillable="false" />
                                   <xs:element            name="HeadingIdentifier"
type="xs:integer" nillable="true" />
                                   <xs:element            name="SampleIdentifier"
type="xs:integer" nillable="true" />
                    </xs:sequence>
               </xs:complexType>
               <xs:key name="AnalysisFrameworkCommentaryPrimaryKey"
msdata:PrimaryKey="true">
                              <xs:selector xpath="." />
                              <xs:field xpath="CommentaryIdentifier" />
               </xs:key>
               <xs:keyref
name="CommentaryCommentaryAnalysisFramework"
refer="CommentaryPrimaryKey">
                              <xs:selector xpath="." />
                              <xs:field xpath="CommentaryIdentifier" />
               </xs:keyref>
               <xs:keyref   name="HeadingCommentaryAnalysisFramework"
refer="HeadingPrimaryKey">
                              <xs:selector xpath="." />
                              <xs:field xpath="HeadingIdentifier" />
               </xs:keyref>
```

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```
            <xs:keyref   name="SampleCommentaryAnalysisFramework"
refer="SamplePrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="SampleIdentifier" />
            </xs:keyref>
        </xs:element>
        <xs:element name="CommentarySegmentSort">
            <xs:complexType>
                <xs:sequence>
                    <xs:element        name="CommentaryIdentifier"
type="xs:integer" nillable="false" />
                    <xs:element        name="SegmentSortIdentifier"
type="xs:integer" nillable="false" />
                    <xs:element        name="HeadingIdentifier"
type="xs:integer" nillable="false" />
                </xs:sequence>
            </xs:complexType>
            <xs:key            name="CommentarySegmentSortPrimaryKey"
msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="CommentaryIdentifier" />
            </xs:key>
            <xs:keyref    name="CommentaryCommentarySegmentSort"
refer="CommentaryPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="CommentaryIdentifier" />
            </xs:keyref>
            <xs:keyref    name="SegmentSortCommentarySegmentSort"
refer="SegmentSortPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="SegmentSortIdentifier" />
            </xs:keyref>
```

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```
                    <xs:keyref              name="HeadingCommentarySegmentSort"
refer="HeadingPrimaryKey">
                                 <xs:selector xpath="." />
                                 <xs:field xpath="HeadingIdentifier" />
5                      </xs:keyref>
                 </xs:element>
             <xs:element name="CommentaryConceptPredecessor">
                 <xs:complexType>
                     <xs:sequence>
10                              <xs:element          name="CommentaryIdentifier"
 type="xs:integer" nillable="false" />
                                 <xs:element
name="PredecessorHeadingIdentifier" type="xs:integer" nillable="false" />
                                 <xs:element
15 name="SuccessorHeadingIdentifier" type="xs:integer" nillable="false" />
                     </xs:sequence>
                 </xs:complexType>
                 <xs:keyref
name="CommentaryCommentaryConceptPredecessor"
20 refer="CommentaryPrimaryKey">
                                 <xs:selector xpath="." />
                                 <xs:field xpath="CommentaryIdentifier" />
                 </xs:keyref>
                 <xs:keyref
25 name="HeadingCommentaryConceptPredecessor" refer="HeadingPrimaryKey">
                                 <xs:selector xpath="." />
                                 <xs:field xpath="PredecessorHeadingIdentifier" />
                 </xs:keyref>
                 <xs:keyref
30 name="HeadingCommentaryConceptPredecessor1"
refer="HeadingPrimaryKey">
                                 <xs:selector xpath="." />
                                 :s:field xpath="SuccessorHeadingIdentifier" />
```

30

```
                </xs:keyref>
            </xs:element>
            <xs:element name="Query">
                <xs:complexType>
5                   <xs:sequence>
                        <xs:element name="Identifier" type="xs:integer"
nillable="false" />
                        <xs:element    name="Name"    type="xs:string"
nillable="false" />
10                      <xs:element    name="Type"    type="xs:string"
nillable="false" />
                    </xs:sequence>
                </xs:complexType>
                <xs:key                         name="QueryPrimaryKey"
15  msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="Identifier" />
                </xs:key>
            </xs:element>
20          <xs:element name="QueryAnalysisFramework">
                <xs:complexType>
                    <xs:sequence>
                        <xs:element             name="QueryIdentifier"
type="xs:integer" nillable="false" />
25                      <xs:element
name="AnalysisFrameworkIdentifier" type="xs:integer" nillable="false" />
                    </xs:sequence>
                </xs:complexType>
                <xs:key           name="QueryAnalysisFrameworkPrimaryKey"
30  msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="QueryIdentifier" />
                    <xs:field xpath="AnalysisFrameworkIdentifier" />
```

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```
                        </xs:key>
                        <xs:keyref              name="QueryQueryAnalysisFramework"
    refer="QueryPrimaryKey">
                                <xs:selector xpath="." />
5                               <xs:field xpath="QueryIdentifier" />
                        </xs:keyref>
                        <xs:keyref
    name="AnalysisFrameworkQueryAnalysisFramework"
    refer="AnalysisFrameworkPrimaryKey">
10                              <xs:selector xpath="." />
                                <xs:field xpath="AnalysisFrameworkIdentifier" />
                        </xs:keyref>
                </xs:element>
                <xs:element name="QueryHeading">
15                      <xs:complexType>
                                <xs:sequence>
                                        <xs:element              name="QueryIdentifier"
    type="xs:integer" nillable="false" />
                                        <xs:element              name="HeadingIdentifier"
20  type="xs:integer" nillable="false" />
                                </xs:sequence>
                        </xs:complexType>
                        <xs:key                  name="QueryHeadingPrimaryKey"
    msdata:PrimaryKey="true">
25                              <xs:selector xpath="." />
                                <xs:field xpath="QueryIdentifier" />
                                <xs:field xpath="HeadingIdentifier" />
                        </xs:key>
                        <xs:keyref               name="QueryQueryHeading"
30  refer="QueryPrimaryKey">
                                <xs:selector xpath="." />
                                <xs:field xpath="QueryIdentifier" />
                        </xs:keyref>
```

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```
                <xs:keyref                              name="HeadingQueryHeading"
refer="HeadingPrimaryKey">
                    <xs:selector xpath="." />
                    <xs:field xpath="HeadingIdentifier" />
5               </xs:keyref>
            </xs:element>
            <xs:element name="QuerySample">
                <xs:complexType>
                    <xs:sequence>
10                      <xs:element                         name="QueryIdentifier"
type="xs:integer" nillable="false" />
                        <xs:element                         name="SampleIdentifier"
type="xs:integer" nillable="true" />
                    </xs:sequence>
15              </xs:complexType>
                <xs:unique                              name="QuerySamplePrimaryKey"
msdata:PrimaryKey="true">
                    <xs:selector xpath="." />
                    <xs:field xpath="QueryIdentifier" />
20                  <xs:field xpath="SampleIdentifier" />
                </xs:unique>
                <xs:keyref                               name="QueryQuerySample"
refer="QueryPrimaryKey">
                    <xs:selector xpath="." />
25                  <xs:field xpath="QueryIdentifier" />
                </xs:keyref>
                <xs:keyref                               name="SampleQuerySample"
refer="SamplePrimaryKey">
                    <xs:selector xpath="." />
30                  <xs:field xpath="SampleIdentifier" />
                </xs:keyref>
            </xs:element>
            <xs:element name="QueryCommentary">
```

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```
<xs:complexType>
    <xs:sequence>
        <xs:element                    name="QueryIdentifier"
type="xs:integer" nillable="false" />
        <xs:element                    name="CommentaryType"
type="xs:string" nillable="false" />
    </xs:sequence>
</xs:complexType>
<xs:key                        name="QueryCommentaryPrimaryKey"
msdata:PrimaryKey="true">
    <xs:selector xpath="." />
    <xs:field xpath="QueryIdentifier" />
</xs:key>
<xs:keyref                      name="QueryQueryCommentary"
refer="QueryPrimaryKey">
    <xs:selector xpath="." />
    <xs:field xpath="QueryIdentifier" />
</xs:keyref>
</xs:element>
<xs:element name="QuerySegmentSort">
    <xs:complexType>
        <xs:sequence>
            <xs:element                name="QueryIdentifier"
type="xs:integer" nillable="false" />
            <xs:element                name="ResultType"
type="xs:string" nillable="false" />
            <xs:element                name="ScopeType"
type="xs:string" nillable="false" />
            <xs:element                name="ParentHeadingsOnly"
type="xs:boolean" nillable="false" />
        </xs:sequence>
    </xs:complexType>
```

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```
                    <xs:key                      name="QuerySegmentSortPrimaryKey"
msdata:PrimaryKey="true">
                            <xs:selector xpath="." />
                            <xs:field xpath="QueryIdentifier" />
5                   </xs:key>
                    <xs:keyref                        name="QueryQuerySegmentSort"
refer="QueryPrimaryKey">
                            <xs:selector xpath="." />
                            <xs:field xpath="QueryIdentifier" />
10                  </xs:keyref>
            </xs:element>
            <xs:element name="QueryText">
                    <xs:complexType>
                            <xs:sequence>
15                                    <xs:element                    name="QueryIdentifier"
type="xs:integer" nillable="false" />
                                    <xs:element name="searchFor" type="xs:string"
nillable="false" />
                                    <xs:element                        name="MatchCase"
20  type="xs:boolean" nillable="false" />
                                    <xs:element          name="FindWholeWordsOnly"
type="xs:boolean" nillable="false" />
                                    <xs:element          name="CommentaryType"
type="xs:string" nillable="false" />
25                                    <xs:element              name="ScopeType"
type="xs:string" nillable="false" />
                            </xs:sequence>
                    </xs:complexType>
                    <xs:key                            name="QueryTextPrimaryKey"
30   msdata:PrimaryKey="true">
                            <xs:selector xpath="." />
                            <xs:field xpath="QueryIdentifier" />
                    </xs:key>
```

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```
                    <xs:keyref                             name="QueryQueryText"
refer="QueryPrimaryKey">
                         <xs:selector xpath="." />
                         <xs:field xpath="QueryIdentifier" />
5                   </xs:keyref>
               </xs:element>
               <xs:element name="QuerySampleCharacteristicValue">
                    <xs:complexType>
                         <xs:sequence>
10                            <xs:element               name="QueryIdentifier"
type="xs:integer" nillable="false" />
                              <xs:element
name="SampleCharacteristicValueIdentifier" type="xs:integer" nillable="false" />
                         </xs:sequence>
15                    </xs:complexType>
                    <xs:key
name="QuerySampleCharacteristicValuePrimaryKey"
msdata:PrimaryKey="true">
                         <xs:selector xpath="." />
20                       <xs:field xpath="QueryIdentifier" />
                         <xs:field   xpath="SampleCharacteristicValueIdentifier"
/>
                    </xs:key>
                    <xs:keyref      name="QueryQuerySampleCharacteristicValue"
25  refer="QueryPrimaryKey">
                         <xs:selector xpath="." />
                         <xs:field xpath="QueryIdentifier" />
                    </xs:keyref>
                    <xs:keyref
30  name="SampleCharacteristicValueQuerySampleCharacteristicValue"
refer="SampleCharacteristicValuePrimaryKey">
                         <xs:selector xpath="." />
```

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```
                <xs:field   xpath="SampleCharacteristicValueIdentifier"
/>
            </xs:keyref>
        </xs:element>
        <xs:element name="Sample">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="Identifier" type="xs:integer"
/>
                    <xs:element name="Name" type="xs:string" />
                </xs:sequence>
            </xs:complexType>
            <xs:key                          name="SamplePrimaryKey"
msdata:PrimaryKey="true">
                <xs:selector xpath="." />
                <xs:field xpath="Identifier" />
            </xs:key>
        </xs:element>
    </xs:schema>
```

While this invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification(s). This application is intended to cover any variations uses or adaptations of the invention following in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice within the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth.

As the present invention may be embodied in several forms without departing from the spirit of the essential characteristics of the invention, it should be understood that the above described embodiments are not to limit the present invention unless otherwise specified, but rather should be construed broadly within the spirit and scope of the invention as defined in the appended claims. Various modifications and equivalent arrangements are intended to be included within the spirit and scope of the invention and appended claims. Therefore, the

specific embodiments are to be understood to be illustrative of the many ways in which the principles of the present invention may be practiced. In the following claims, means-plus-function clauses are intended to cover structures as performing the defined function and not only structural equivalents, but also
5   equivalent structures. For example, although a nail and a screw may not be structural equivalents in that a nail employs a cylindrical surface to secure wooden parts together, whereas a screw employs a helical surface to secure wooden parts together, in the environment of fastening wooden parts, a nail and a screw are equivalent structures.

10   "Comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.